

1           1.    A method comprising:  
2                   forming a film including diamond and non-diamond  
3 forms of carbon; and  
4                   gasifying carbon to increase the porosity of the  
5 film.

1           2.    The method of claim 1 including forming a film of  
2 Sp<sub>2</sub> and Sp<sub>3</sub> carbon.

1           3.    The method of claim 1 including using chemical  
2 vapor deposition to deposit said film.

1           4.    The method of claim 1 including forming a film  
2 with a mixture of hydrocarbon and a super saturation of  
3 hydrogen.

1           5.    The method of claim 4 including adjusting the  
2 ratio of hydrocarbon to hydrogen to form a film with both  
3 Sp<sub>2</sub> and Sp<sub>3</sub> bonded carbon.

1           6.    The method of claim 5 including using 10 to 20  
2 percent methane in hydrogen to form Sp<sub>2</sub> and Sp<sub>3</sub> bonded  
3 carbon.

1           7.    The method of claim 1 wherein gasifying carbon  
2 includes exposing the film to oxygen plasma.

1        8.    The method of claim 7 including exposing said  
2 film to a plasma without bias.

1        9.    The method of claim 8 including exposing said  
2 film to plasma attack from the sides of the film while  
3 covering the top of the film.

1        10.   The method of claim 1 including forming said film  
2 having a dielectric constant less than 2.

1        11.   The method of claim 1 including forming said film  
2 having a porosity of about 50 percent.

1        12.   A method comprising:  
2                forming a semiconductor film comprising  
3 significant amounts of both Sp3 and Sp2 bonded carbon.

1        13.   The method of claim 12 including gasifying the  
2 Sp2 carbon to increase the porosity of the film.

1        14.   The method of claim 12 including gasifying said  
2 Sp2 film by exposing said film to oxygen plasma.

1        15.   The method of claim 14 including exposing said  
2 film to oxygen plasma while the top of said film is covered  
3 and the sides of said film are exposed.

1        16. The method of claim 12 including forming said  
2 film with a dielectric constant less than 2.

1        17. The method of claim 12 including forming said  
2 film having a porosity of about 50 percent.

1        18. A semiconductor structure comprising:  
2            a substrate; and  
3            a film on said substrate, said film including  
4 diamond and having a dielectric constant less than 2.

1        19. The structure of claim 18 wherein said film has a  
2 porosity of about 50 percent.

1        20. The structure of claim 18 including a metallic  
2 layer over said film.

1        21. The structure of claim 20 wherein said metallic  
2 layer includes copper.

1        22. A semiconductor structure comprising:  
2            a substrate; and  
3            a film containing significant amounts of Sp<sup>2</sup> and  
4 Sp<sup>3</sup> bonded carbon.

1        23. The structure of claim 22 wherein said Sp3 bonded  
2 carbon is diamond and said Sp2 bonded carbon includes  
3 graphite.

1        24. The structure of claim 22 including a hard mask  
2 over said film.

1        25. The structure of claim 24 wherein said film is  
2 etched in a pattern.

1        26. A semiconductor structure comprising:  
2                a substrate; and  
3                a film containing diamond and non-diamond forms  
4 of carbon in significant amounts.

1        27. The structure of claim 22 wherein said non-carbon  
2 diamond includes graphite.

1        28. The structure of claim 22 formed over a  
2 semiconductor substrate.